

Automating the Patent and Trademark Office

A Report to the Congress
by the Commissioner
of Patents and Trademarks
Under Section 9 of P.L. 96-517



U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office



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U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

PREFACE

This document presents the Patent and Trademark Office (PTO) master plan for automating office operations. The plan is the outgrowth of a recognized need to improve patent and trademark operations through application of computer technology. Preparation of the plan was mandated by Section 9 of P.L. 96-517 which states:

"The Commissioner of Patents and Trademarks shall report to Congress, within two years after the effective date of this Act, a plan to identify and if necessary develop or have developed computerized data and retrieval systems equivalent to the latest state of the art which can be applied to all aspects of the operation of the Patent and Trademark Office, and particularly to the patent search file, the patent classification system and the trademark search file. The report shall specify the cost of implementing the plan, how rapidly the plan can be implemented by the Patent and Trademark Office, without regard to funding which is or which may be available for this purpose in the future."

The goal of the plan is to automate the PTO completely by the 1990's. The plan was developed considering the mission of the PTO, existing automated systems and mission support needs, and areas where automation will produce operational benefits. Particular attention was given to program and management requirements achievable within the limits of current and emerging automation technology.

Automation will be accomplished in three stages. During the first stage, one patent group (Group 220), which deals with all areas of technology, will be automated. Supporting pre-examination, post-examination, classification, and management information will be automated as well. In addition to Group 220, all of trademarks will be automated. The other patent groups and functions will be automated in the second stage. The final stage will expand dissemination and access capabilities and make possible worldwide electronic access to patent and trademark information.

A PTO team from program and support offices, coordinated by the Office of Finance and Planning, prepared the plan. It was augmented by a team from the MITRE Corporation which provided an independent assessment of automation technology. Commissioner Mossinghoff appointed a special advisory committee to review and evaluate the draft plan. Experts in the field of automation from other government agencies comprised this committee: Dr. Rona B. Stillman, Associate Director (Technical), Directorate of Computer Resources, Headquarters United States Air Force; Mr. James H. Burrows, Director, Institute for Computer Sciences and Technology, National Bureau of Standards; Mr. Melvin S. Day, Director, National Technical Information Service; and Mr. Louis N. Lushina, Director, Information Systems Division, National Aeronautics and Space Administration. Arlene Triplett, Assistant Secretary for Administration, and Dennis Boyd, Executive Director, Information Resource Management, both with the Department of Commerce, provided guidance and assistance throughout the conduct of the study. In addition, over 600 copies of the draft plan were circulated to individuals, commercial organizations, and interested associations for their comment. The PTO held a public hearing to provide a forum for comment and reaction to the Section 9 requirement of P.L. 96-517. The participation and recommendations by both constituents and vendors provided a valuable contribution to the preparation of the final master plan.

To complete the plan and begin its implementation, centralized management of the automation program was needed to assure that plans will be coordinated and resources effectively used. This was accomplished through the organization of all automation activities into a single office under an Administrator for Automation. To assure continuing top management involvement and guidance as the plan is implemented, an automation coordinating committee, chaired by the Commissioner of Patents and Trademarks and composed of the managers of the program and support offices, was formed. The Commissioner was involved personally in planning this important automation project and approved all key managerial strategies. Among these were decisions to rely heavily on the private sector to provide the automated capabilities that will be required and to offer maximum latitude for private sector involvement in long term automation operations.

Volume 1

AUTOMATING THE PATENT AND TRADEMARK OFFICE

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Volume 2

AUTOMATION MASTER PLAN

(Separately Bound)

Introduction
 Patent Requirements
 Trademark Requirements
 Management Requirements
 System Requirements
 Life Cycle Strategy
 Plan of Work
 Program Costs

Volume 3

AUTOMATION MASTER PLAN APPENDICES

(Separately Bound)

Current Automated Systems
 Quantitative Characteristics of PTO Operations
 Technology Analyses

VOLUME 1

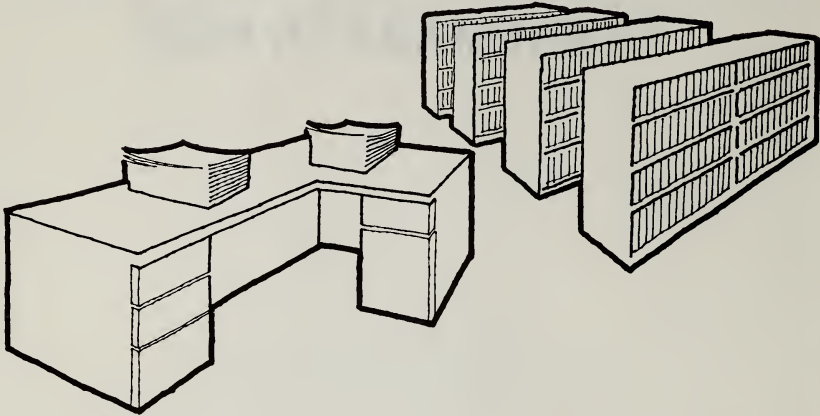
**AUTOMATING THE PATENT AND
TRADEMARK OFFICE**

DEPARTMENT OF COMMERCE
Patent and Trademark Office

September 15, 1982

Mission Needs:

To Reverse Current Trends



- Search documents are stored and retrieved in an *all-paper hand-file* system—*24 million* documents on file now will double by the year 2000.
- 7% of the 24 million documents are *missing or misfiled*.
- Error-plagued *manual handling* of *340,000* active cases and *20,000* papers received each day is *reducing productivity*.
- Decisions to grant patents and register trademarks are increasingly based on incomplete data.

MISSION NEEDS

The mission of the Patent and Trademark Office (PTO) is to promote the national economy by administering the provisions of the patent and trademark laws of the United States. Patent laws encourage technological advancement by providing incentives to invent, invest in, and disclose new technology. Trademark laws assist businesses in protecting their investments in the promotion of goods and services and safeguarding consumers against confusion and deception in the market place as to the origin of goods and services.

To carry out this mission, the PTO processes and examines over 100,000 patent and 60,000 trademark applications annually. In the examination process, the PTO compares patent application subject matter to a large body of technological information to determine that the inventions are new and not obvious to someone knowledgeable in that field. The Trademarks shown in new applications are compared to registered product and service brand names to ensure they are not confusingly similar. For the most part, the comparison process is carried out manually by searching paper files which are organized for this purpose. Applications are handled by routing paper copies and maintaining manual control and reporting procedures.

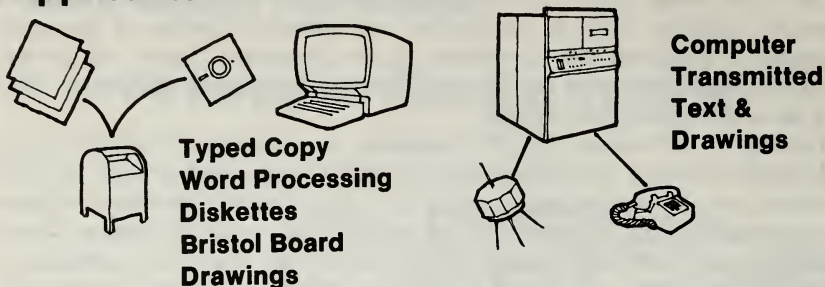
The already large body of information against which applications must be compared is growing rapidly. The continued growth of paper files is at the heart of the problem the PTO faces in carrying out its mission effectively. As the information base increases, the resources necessary to maintain it in a usable form also increase. Since the files are paper and loosely assembled to facilitate searching, their integrity is degrading steadily because of lost or misfiled documents. Up to seven percent of the 24 million document file is missing at any point in time. These factors threaten to compromise the quality, even the viability, of the patent grant and the trademark registration. Processing paper applications requires moving large amounts of paper frequently and matching some 20,000 pieces of mail daily with corresponding files distributed throughout PTO offices. Resources to maintain the search files and the paper handling procedures have been diverted from functions which directly support the PTO mission. As a result, filing receipts have become delayed, responses to correspondence have become slow, papers and files have been lost, backlogs have increased and are reflected in increased application pendency time. The longer pendency periods are in conflict with the mission objectives of quickly conferring rights to inventions, registering trademarks, and disseminating information to the public.

Patent information dissemination is important because of the "multiplier" effect technological disclosures have on further invention and potential infringement. Trademark information dissemination is important because it allows businesses to determine the availability of marks and the existence of potential infringement. Dissemination is limited by paper files located only in the PTO in the Washington, D.C. area. The files are costly to reproduce and maintain in more accessible locations around the country. Similarly, methods of accessing the patent paper file are largely restricted to the use of the patent classification system.

The methods for satisfying mission needs are limited to either increasing staff or developing a more efficient process. The PTO has chosen a balanced course of action which will improve quality and reduce backlogs in the short run by redirecting staff resources to critical operating problems, and in the long run by developing a more efficient process through extensive automation. The development of an automated system to support future operations is one of the highest priority mission needs of the PTO.

Future Operations

Applicants

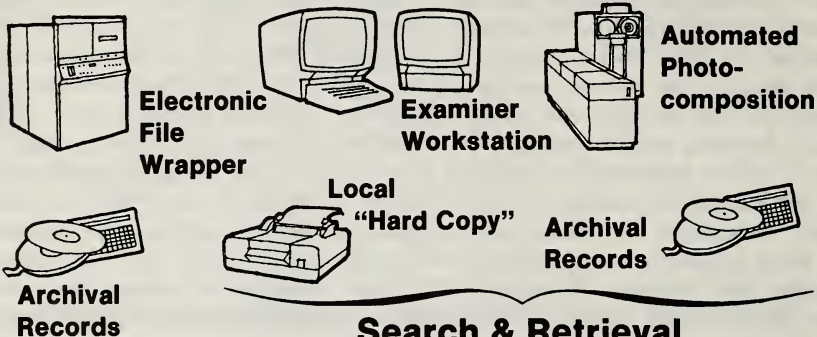


Patent & Trademark Office

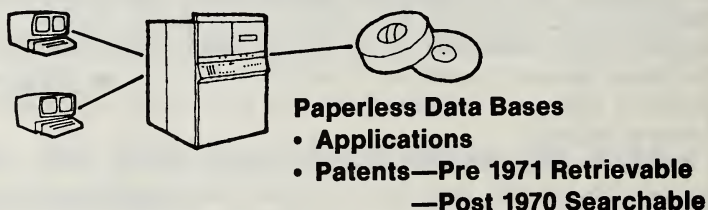
Pre-Examination

Examination

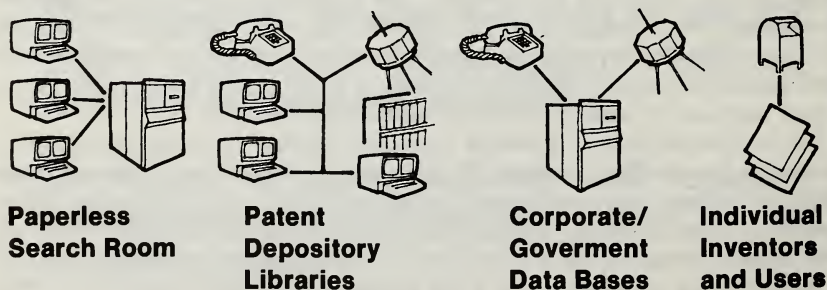
Post-Examination



Search & Retrieval



Users



FUTURE OPERATIONS

The primary goal of the automation program is to support more fully all PTO processes so that they are completed in a more timely and efficient manner. This goal will be realized through a paperless patent and trademark operation. Three automation capabilities are key to this concept. First, paper files and paper handling operations will be replaced by electronic and other computer accessible data bases. Second, communications with applicants and constituents will be in modes and media chosen by them and supported through electronic terminals, telecommunications and other automation technology. Finally, all patent and trademark pre-examination, examination, post-examination, classification, and management control functions will be supported through electronic workstations and fully automated or computer assisted operations. Through the workstations, data base access will be obtained and routine operations, consistent with standard practices and the intellectual, professional nature of the work, will be performed.

Today, processing is accomplished through predominantly manual operations. A patent application arrives in the office where pre-examination activities—fee processing, bibliographic data base creation, receipting, tentative art unit (or technology) selection, file wrapper preparation, statutory compliance checking and national defense security screening—are performed. Then the application is forwarded to an art unit where, after waiting its turn, the application undergoes examination. This includes a search of U.S. patents, foreign patents, non-patent literature, and related pending applications for possible interference. Next, the examiner prepares official actions, communications, and interview summaries, as appropriate. Following the examination, supervisors and quality control personnel may review the results. Some applications undergo additional processing related to interference, appeals and other matters. Entry of the approved application into a photo-composition data base, fee processing, patent printing, and archiving constitute post-examination. Processing for trademarks is analogous.

In the future system, current paper files will be replaced by electronic text and digital image data bases. The electronic text data base for patents will contain most U.S. patents issued between 1971 and 1975 and all U.S. patents since 1975. The rest of the files will be selectively incorporated. All active trademark registrations will also be stored in an electronic text data base. The image data base will contain all drawings and the entire backfile of text not in the electronic text data base. In addition, the image data base will contain foreign patents and technical reference literature. All pending applications will be included in both the electronic text and image data bases. Currently, all papers relating to an application are collected in a paper folder known as the "file wrapper." In the automated system, an "electronic file wrapper" will tie together all text and images associated with an application. Passwords and other techniques will be used to maintain application confidentiality and protect national security interests.

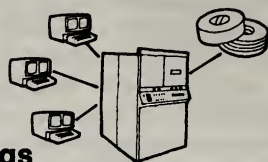
Communication with an applicant will be conducted in one of three basic modes. Paper applications still will be accepted, but in a standard format to maximize the efficiency of converting them to machine readable form. Applications also will be accepted on word processing media or directly from another computer by telecommunications. The transmission of office actions, receipts, and other correspondence will be in any of the above modes, as chosen by the applicant.

Automation of all operations will require supporting a large variety of users—both internal and external. Internal users will perform their primary functions using

Search & Retrieval

All Post-1970 & Selected Pre-1971 U.S. Patents

- **Searchable Full Text**
- **Computer Retrievable Drawings**



Entire Patent Backfile

- **Searchable by Sub-Classes**
- **Computer Retrievable**
- **Rapid Display in Eye-Easy Form**
- **Available on Microform**

Foreign References and Technical Literature

- **Computer Retrievable**
- **Available on Microform**
- **Automated Input from Foreign Patent Offices**
- **Examiner Selected Input**

Commercial and Foreign Data Bases

Automated Search Methods

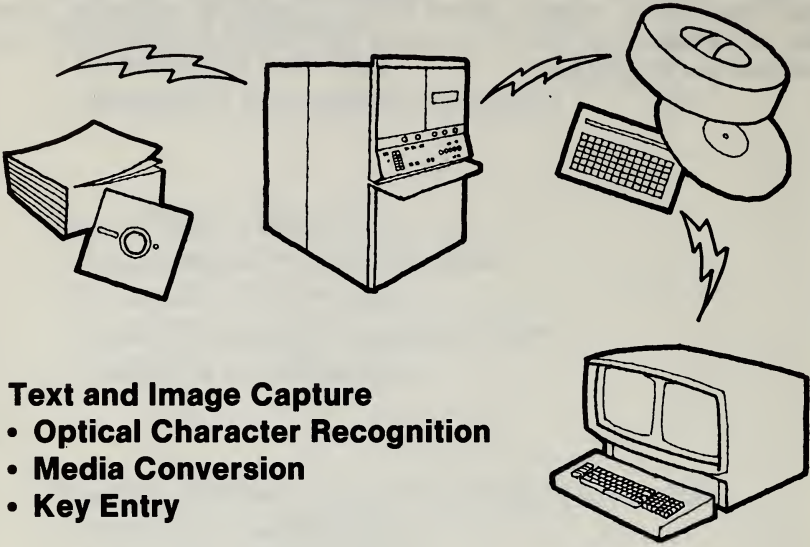
- **Key Word** • **Index** • **Full Text**
- **Thesaurus** • **Classification**

Computer Retrieval of Text and Images

- **Visual Display Terminals**
- **Paper** • **Microform**

electronic workstations to gain access to the electronic data bases and perform other tasks. The workstation will provide easy-to-use controls and procedures with capabilities for satisfying the unique requirements of each user. Capabilities will include search and retrieval of data from the text and the image data bases; the collection, analysis and reporting of management information; data entry and data base maintenance; and a variety of professional and administrative services. These capabilities will allow the functions of pre-examination, examination and post-examination to be accomplished entirely through the automated system. They will eliminate the need for processing and routing applications and related correspondence in paper form.

Pre-Examination



Text and Image Capture

- Optical Character Recognition
- Media Conversion
- Key Entry

Creation of "Electronic File Wrapper"

- Date Stamping • Numbering • Classification
- Bibliographic Extraction
- Text and Image Referencing

Computer Assisted Preprocessing

- Statutory Screening • Security Screening
- Fee Processing • Receipting • Initial Docketing

Archival Record of all Papers

Management Data Capture

Communication Mode Chosen by Applicant

Pre-examination

Applications will be submitted to the PTO either in machine readable form on diskette or directly through telecommunications. Alternatively, they may be submitted on paper that can be processed by an optical character reader (OCR) or by keying. After initial processing, the contents of the application will be in a form suitable for processing into the electronic text and image data bases. An "electronic file wrapper" will be created and assigned a serial number through a computer assisted process. The entire contents of the "wrapper" then will be available for direct viewing at an electronic workstation, where it will be reviewed for statutory and rule compliances, screened for national security implications, classified by technology or art area for routing to an examination group, and checked for correct fee submission. Financial transactions will be generated. After these steps, an archival copy will be made. With the entire contents of the application now captured in electronic form and copied for the archives, the original application, if not transmitted electronically, may be destroyed or returned with an acknowledgement receipt.

Beginning with data capture and pre-examination processing, the system will record and maintain a data base that reflects the status of the application through each processing step.

Examination

Automated Examiner Docket Update



Application Review—Electronic File Wrapper Access

- Bibliographic Data • Text and Images
- Reference Documents/Images

Data Base Search & Retrieval

- Patents and Applications
- Foreign Data Bases
- Commercial Data Bases
- Optional “Hard Copy”



Examiner Generated Private Files

- Document Annotation
- Informal Bibliographies

Office Actions

- Examiner Generated Using Form Paragraphs
- Composition and Editing
- Routing for Pool Generation
- Automatic Entry in Electronic File Wrapper and Archived



Application Paper Entered in Electronic File Wrapper & Archived

Professional Services at Electronic Workstation

- Access to Regulations, Statutes, Operating Procedures
- Electronic Mail
- Calendar Maintenance
- Directory Assistance
- Document Distribution

Examination

After pre-examination, an application will automatically be placed on a patent group's electronic examination list (docket). A supervisor will be able to retrieve and review the application and further assign it to an appropriate art unit and/or examiner by placing it on either a unit or examiner electronic docket.

The examination will be conducted entirely at an electronic workstation. The examiner will retrieve the electronic file wrapper for application review. The workstation will have multiple display screens so that the examiner may view both the text and the drawings of any document and compare the application text and drawings to those of other patent or reference materials. Examiners will have the ability to print high quality copies of electronic documents. All U.S. patents and pending applications will be searched to detect potential interferences; i.e., other applications with conflicting claims. Through commercial data bases, the examiner may access English translations of foreign patent abstracts and non-patent literature. Examiners may save and annotate electronic copies of these searches in personal electronic files for future reference. Computerized search aids, such as the Master Classification File, the Classification Index, the Manual of Classification, and the classification definitions, will be available to identify appropriate classes/subclasses and patents. Additionally, computerized technical thesauri will be available to help identify equivalent conceptual terms. Ownership assignment files will be accessible to identify other patents by the same inventor or assigned to the same company.

The examiner will prepare the Office action, including suggested changes to specifications and claims of the application, using form paragraphs to limit manual effort and reduce the need for typist assistance. Memoranda of attorney-examiner interviews can also be prepared and sent more easily and speedily. Application changes will be integrated into the data bases which subsequently will be used to print the patent grant. All application modifications and correspondence will be stored, forming an electronic file history, until they can be archived and removed from the on-line system.

If the examiner has a question about procedure or legal information, the workstation can be used to retrieve the text of references such as the Manual of Patent Examining Procedures, federal regulations, Board of Appeals decisions, relevant portions of the U.S. Code, petitions to the Commissioner, and the decisions of Courts of Record. Commercial data bases may be accessed.

The workstation will be part of a "local" network to permit electronic mail, message center service, directory assistance, and other professional support services. Supervisors may have work routed to them electronically for review. This will contribute to efficiency and productivity by speeding review and coordination. Management will have immediate access to active application status and production data.

Once the application has been approved for issue or rejected, the normal patent examination phase is completed. The data bases will be updated to indicate final disposition of the application and released for post-examination processing.

The processing of international applications, under the Patent Cooperation Treaty (PCT), will be handled in a similar system with the possibility of electronic exchange with other countries, the World Intellectual Property Organization, and the international administrative body of the PCT.

Post-Examination

**Photocomposition from
Electronic File Wrapper**

**Automated Random
Selection of Cases
for Quality Review**

Fee Processing

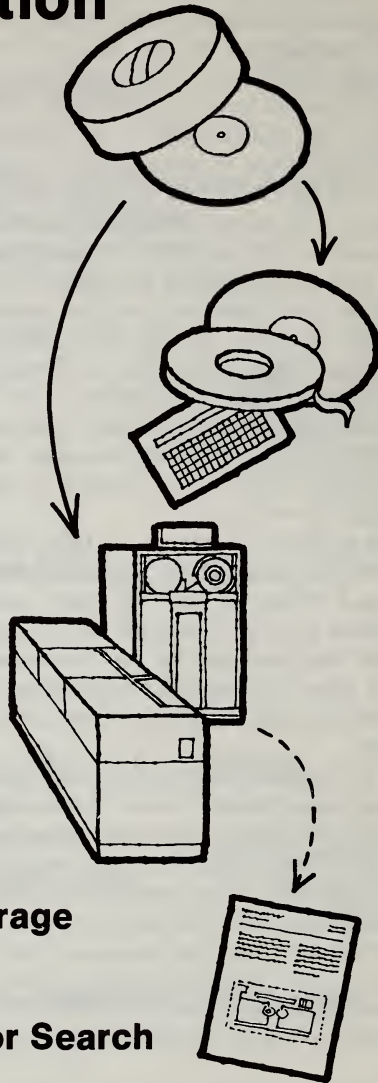
**Archiving of Entire File
Wrapper in Microform**

- Stored locally for rapid retrieval
- Permanent off-site storage

Automatic Availability for Search

Copies Automatically Generated

- Paper
- Microform
- Electronic



Post-examination

Once the examination is completed, the approved application will be extracted automatically from the electronic data base and prepared for photo composition. The final form will be reviewed and approved at a workstation. A random sample of cases will be automatically selected and docketed for quality review. Fee processing will be initiated.

The complete contents of all electronic file wrappers will be archived in a readily retrievable form. Abandoned applications will be flagged as owner proprietary. Following this process, patents will be made available for public search and subsequent dissemination to interested domestic organizations and foreign patent offices. If a new patent application cites an abandoned application, however, the abandoned patent will become public. It will be retrieved from the archives and entered in the searchable data bases.

Maintenance fee processing and status information on issued patents will be handled through the system, in addition to the re-examination of issued patents.

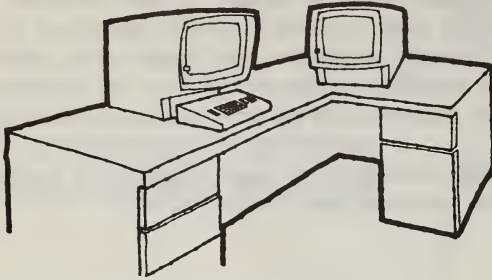
Trademark Operations

There are similarities in the functions which support the patent and trademark processes but also significant differences. Pending trademark applications are available to the public while pending patent applications are confidential. The same search files are used by trademark examiners and the public while there are separate patent search files for examiner and public use. Potential references can be identified for examiner evaluation with far less human intervention during the trademark search than is possible with patents. Although the searching function is simpler and does not require the number of iterations that patent searching does, the search techniques are equivalent. The first search can be accomplished with the system by matching search criteria to full or partial text and/or design mark attributes. The examiner will have options of searching with synonymous or phonic equivalents and/or of constructing more refined searches based on the results of previous searches.

The trademark registration procedure contains several steps that have no exact counterpart in patents. When an application is allowed by the examiner, it is published for opposition. The opposition period, in which the public can institute legal proceedings against registration of the mark, is thirty days. Thereafter, if no opposition is filed, the registration is issued. While trademarks are registered for twenty years, a mark will be cancelled if the registrant fails to file an affidavit of use by the sixth anniversary. When the affidavit of use is filed, the remainder of a twenty year cycle of legal rights is instituted. Thereafter, a registration may be renewed every twenty years as long as the mark continues to be used.

As has been described for patents, the future system will support all phases of trademark operations. The trademark data base will include text and images related to word and design marks. The design marks will be indexed to facilitate retrieval. An ownership data base will provide the chronology of ownership, including licenses. Also, data on application/registration status will be maintained. This will provide a complete history of the application/registration, including all communications between the applicant/ owner and the Office. Data base access will be accomplished through electronic workstations using system capabilities similar to those discussed with reference to patents. Pre-examination, post-examination, and management functions also will be supported in a comparable manner.

Management



Automated Planning Aids

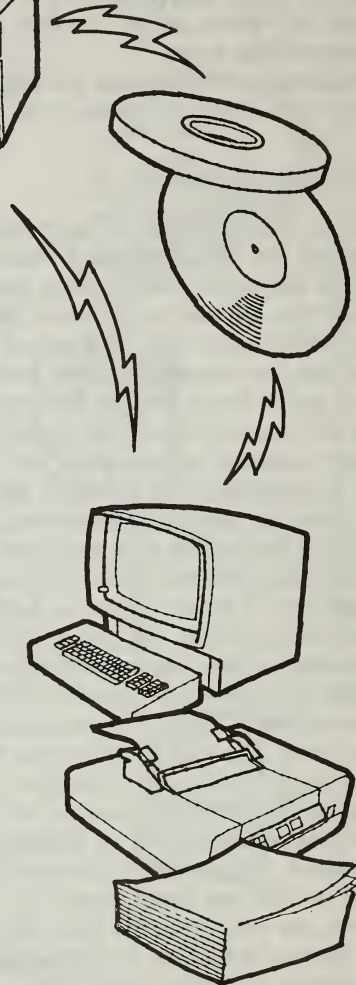
- Modeling
- Project Scheduling

On-line Management Information

- Application Status
- Production Statistics
- Project Tracking
- Administrative Information, Personnel, Budget, Accounting

Automated Office Tools

- Word Processing
- Electronic Mail
- Document Routing
- Calendar Coordination
- Operating Procedures



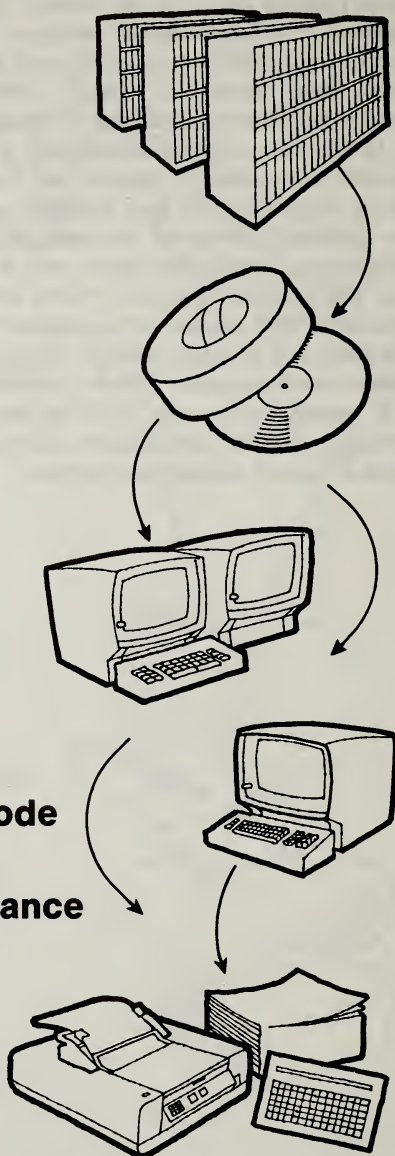
Management

The PTO management functions are typical of any large organization and include planning, directing, coordinating, and controlling. Planning is becoming an increasingly formalized effort to better control mission performance by continuously comparing actual to planned accomplishments. Management currently uses models to aid in planning and budgeting by projecting resource requirements needed to meet program goals. In the future, more sophisticated analytical models will be required to refine production estimates and schedules. More comprehensive activity tracking aids will be required to assist with program control. Model data will need to be linked directly to budget formulation, and planning systems, in turn, will need to be linked to accounting and budget execution.

In the future system, management will be supported by more complete and up-to-date management information. Automatic or semi-automatic activity and event recording, data base updating and management information reporting will be performed. Interactive terminals will allow immediate access to all management information. Status information may be compared to plans, variances highlighted, and summary electronic reports produced. Models will be available to allow the entire work process to be examined under hypothetical conditions as an aid to planning and decision making. Work products may be routed electronically for review and concurrence. Proposed plans on actions may be electronically coordinated. The system will provide electronic mail, document routing, project scheduling/tracking, calendar coordination, operating procedures retrieval, and other similar tools to support management functions.

System Requirements

- **Paperless Operation**
- **Full Operational Support**
- **"User Friendly" Workstation**
- **Varied Data Base Access Techniques**
- **Applicant Selection of Communication Mode**
- **High System Performance Standards-Complete Redundancy**



SYSTEM REQUIREMENTS

The concept of future PTO operations, briefly described in the preceding sections, requires a number of operational features that will determine the architecture of the system of the 1990's. The more significant of these are described below.

To achieve a paperless operation, it will be necessary to convert current and future files into electronic text and image data bases. Image data must be either stored electronically using optical or conventional magnetic disk technology, or stored as micro images and converted to electronic form at time of retrieval so that it can be transmitted to electronic workstations. Because of the size and costs of data base storage and retrieval, centralized master data bases will be necessary. The current files, which already would tax the capacity of available computer magnetic storage devices, are expanding continuously. High speed search—using a variety of techniques such as keywords, classification indexes, full text scanning—and high speed retrieval and transmission of electronic text and images will be necessary. Images will be closely scrutinized and, therefore, require high resolution storage and display.

The future system must support all functional operations of the PTO. This will require supporting a large number and variety of users—over 2,000 professional examiners and information specialists, administrative and clerical support personnel, managers and executives—within the PTO. In addition, the system must support applicants, attorneys, and other users outside the PTO. Each user group will place different demands on the system, depending on the nature of its needs or work.

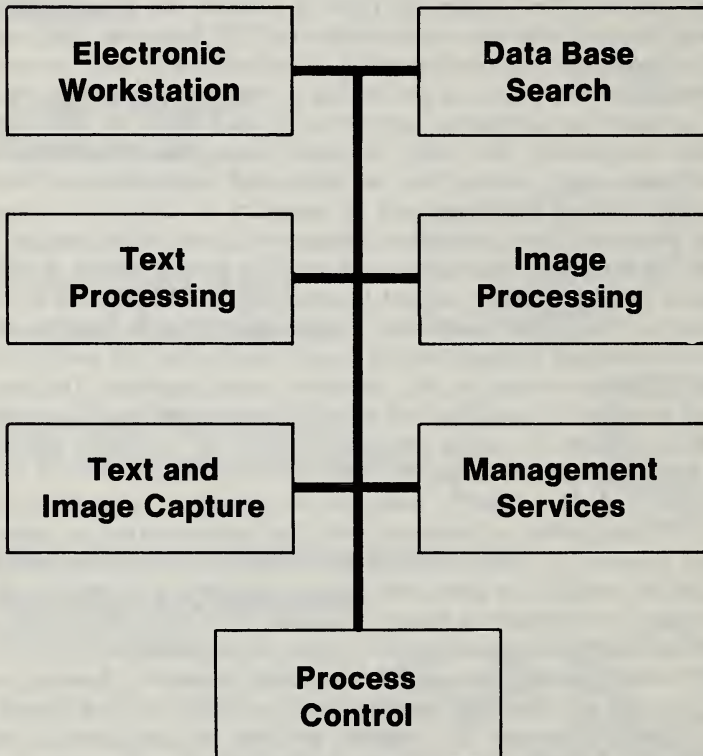
Uniformity and consistency in the method of workstation operation will be important to make the workstation easy to use by each group of users. However, workstation configurations that satisfy the unique display and control needs of each group will be necessary to keep their use simple and to minimize cost. For novice users, computer-aided instruction will be necessary to supplement menu-driven operating procedures. Some workstation configurations must include multiple displays which may be subdivided into multiple work areas for viewing, editing, or composing. A sufficient number of clearly labeled function keys will be required to minimize keystroking and to control workstation components. For more experienced users, an alternate command language will be needed to expedite task performance and minimize frustration caused by long, forced-use menu sequences. Uniform procedures and language for accessing and using all data bases, including commercial ones, will be required. To access commercial data bases, translation will be necessary for uniformity and user simplicity.

Applicants and other non-PTO users will be allowed to select the medium or mode of communicating or interacting with the system—either on paper, word-processing diskettes, or electronically from a terminal or another computer. This will require the capability to accept and process a variety of data formats and media and to produce a corresponding variety of outputs. PTO users will, likewise, have a choice of the output medium— electronic, paper, and/or microform.

System performance requirements will be extremely demanding. Response times for search, retrieval, and document scanning must be within the time frames set by current practice. Documents in a selected set must be simultaneously available, and the text and drawings simultaneously visible. Paging and document selection must match manual rates. In a paperless operation, the automated system will be the only reasonable method of accomplishing PTO functions. Consequently, the system must not be degraded by component failures to the extent that operational functions will be affected significantly.

System Development Approach

- **Modular Architectural Concept**
- **Early Operating Capabilities**
- **Evolutionary Expansion & Enrichment**
- **Maximum use of Shelf Components**
- **Consistency in Interfaces**



SYSTEM DEVELOPMENT APPROACH

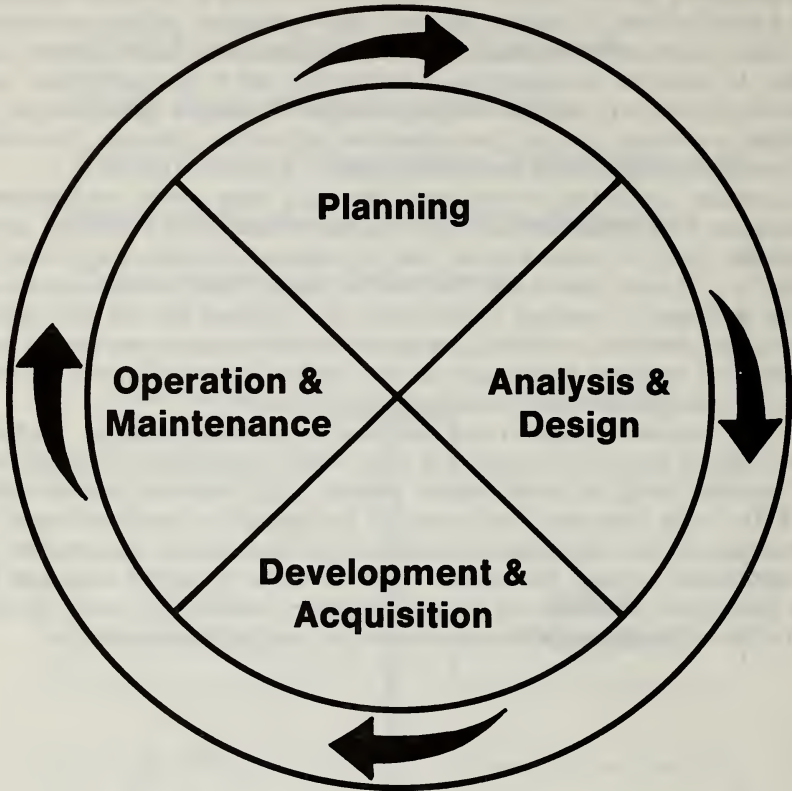
Automated system capabilities required for future operations are extensive. Many are currently available off-the-shelf while others are just emerging. There is no single system available today, however, that will satisfy all requirements. With this in mind, the PTO has formulated the system development approach summarized below.

A preliminary technical concept of the system was formed by grouping capabilities into a small number of distinct, narrow-purpose categories. Existing technology and shelf components were matched with these categories to assess technical feasibility, to determine the magnitude of development still to be accomplished, and to develop preliminary schedule and cost estimates. While this assessment has established a technical concept, the architecture will undergo extensive refinement and extension during the next development phase.

A modular architecture is envisioned. The major components—the Electronic Workstation, User/Workstation Services, Data Base Search, Text Processing, Image Processing, Text and Image Capture, and Management Services—will be tied together by a Process Control and Network component. Each modular component will be developed or procured independently and integrated into the total system with minimal conflict. In addition, components may be replaced over time to take advantage of emerging technologies as they become commercially available and more cost effective, without disturbing other components.

In each component, a subset was identified for an initial operating capability to be achieved early in the system life cycle. Initial capabilities will be enriched and expanded during the second stage to establish a fully paperless operation within the PTO. In the third stage, the system will be expanded to satisfy additional requirements and take advantage of technical and cost-beneficial opportunities. In this evolutionary approach, the technical objectives will be to establish component design features and interfaces and to retain maximum consistency in them throughout the life cycle. Off-the-shelf components will be used to the extent possible.

Life Cycle Strategy



- **Life Cycle Framework**
- **Development and Data Base Standards**
- **System Integration Contractor**
- **Maximum Competition for Independent Components**
- **Maximum Flexibility in Business Arrangements**
- **Integrated Development, Transition, & Conversion Plan**
- **Management Framework**

LIFE CYCLE STRATEGY

The future system will be developed within the framework of system life cycle guidelines adapted from Federal Information Processing Standards to meet the particular needs of this undertaking. In this framework, the life cycle is subdivided into distinct phases, each of which has associated certain activities, end-products, and decisions. This structure will give better visibility to and provide better control by program and executive management. A conventional system development is planned. It can be developed and integrated using technology, products, and services that are commercially available and does not warrant the time and cost of design competition step.

Use of life cycle guidelines implies the use of documentation and other standards to assist in quality assurance. PTO will adopt standards and guidelines necessary to carry out a comprehensive quality assurance program. The quality assurance program will independently test and evaluate development work and products as they occur or become available. The program will be broadened to include data and data base standards which are necessary for design and for minimizing transition and conversion conflicts.

A systems engineering contractor will be selected to work with the PTO throughout the design and development phases of the life cycle, to complete the system architecture and design, and to perform the critical job of component integration. In addition, the systems contractor will perform necessary design trade-off studies, develop component design and acquisition specifications, and assist in procurement of necessary components and/or services.

All acquisition actions will conform to federal procurement regulations to achieve maximum practical competition for products or services. In addition, maximum flexibility in business arrangements, for government or private sector ownership and/or operation, will be allowed to satisfy the objectives of OMB Circular A-76. Acquisitions will be conducted through a formal source selection process in which a technical evaluation board will be chaired by the PTO; membership will include the systems engineering contractor. An advisory board will be chaired by the PTO with membership overlapping the membership of the automation coordinating committee and including Department of Commerce (DoC) representation. The contracting officer(s) will be appointed by DoC. The source selection authority will be a PTO official.

The PTO will rely largely on a systems engineering contractor and commercially available products and services. Internal PTO staff will be used only where it is most effective or mandatory. PTO activities will include overall direction and oversight of the entire development process, systems analysis where required, quality assurance, data base administration, and system design control. Internal staff will continue the development and evolution of the management services component and operation and maintenance of current automated systems. They also will perform and/or manage data base conversion activities.

The plan summarized here and presented in detail in the supporting documents encompasses all of the PTO's automated system activities, current system maintenance and operation, future system development, and all activities necessary to make the transition from current operations to the future system. Maintaining a single, integrated automation master plan will help management focus on the total program and resolve priority issues that will arise.

The management organization for carrying out the PTO automation program has been established. It is composed of an automation coordinating committee, which reports to the Commissioner of Patents and Trademarks and consists of management representatives from the patent and trademark programs as well as supporting staff offices. Direct program responsibility has been assigned to an Administrator for Automation who reports to the Assistant Commissioner for Finance and Planning. Full implementation authority, including monitoring of all automation resources, has been centralized under the Administrator for Automation to allow single point direction of the program.

System Implementation Milestones

Operating Capabilities

Stage 1	Stage 2	Stage 3
<hr/> Patents: <ul style="list-style-type: none"> •Selected pre-examination processing •Single group examination processing •Selected post-examination processing •Selected Classification Trademarks: <ul style="list-style-type: none"> •All pre-examination processing •All examination processing •All post-examination processing Management: <ul style="list-style-type: none"> •Current systems <hr/>	<hr/> Patents and Trademarks: <ul style="list-style-type: none"> •All pre-examination processing •All Examination processing search •All post-examination processing •All Classification •Paperless search files—100% integrity •Pilot paperless Public Search Room Management: <ul style="list-style-type: none"> •Fully Integrated management information system <hr/>	<hr/> Patents and Trademarks: <ul style="list-style-type: none"> •All-Technology upgrades •Expanded public facilities •Expanded telecommunications •Extended dissemination support •Direct foreign data exchange <hr/>
1983-1984	1985-1987	1988-1990

SYSTEM IMPLEMENTATION MILESTONES

The automation program will be attained in three stages. Initial operating capabilities, to be implemented by the end of 1984, will include all basic components and necessary data bases. The Text and Image Capture component will accept and process data to be added to the electronic data bases. Potentially, all data for both patent and trademark applications will be converted to electronic and/or image form and archival records produced. Applications from Group 220, which is the first patent examining group selected for automation, and all of the trademark applications will be processed into the active data bases for use during this stage. A sub-set of the patent files and the entire trademark data base will be established. The Electronic Workstation and Workstation Services component will be implemented to allow each manager, examiner, and clerk to access the data bases using the Data Base Search components. This will be accomplished through a multi-purpose workstation for all first stage users. Finally, operational capabilities will include a local communications network. Current management information support systems will be maintained and modified as necessary to accommodate changes resulting from initial operational capabilities.

System capabilities will be expanded during the subsequent three-year stage to support all local PTO operations by the end of 1987. The capability to capture, process, and maintain all application papers for all groups will be provided. Pre-examination and examination will be based on a paperless operation. Search and retrieval of existing U.S. patents, foreign patents, non-patent literature, and commercial data bases will be totally automated. Post-examination processing and the capability to produce the necessary outputs for printing will be fully developed and integrated with the Management Services component. A pilot paperless public search room will be established.

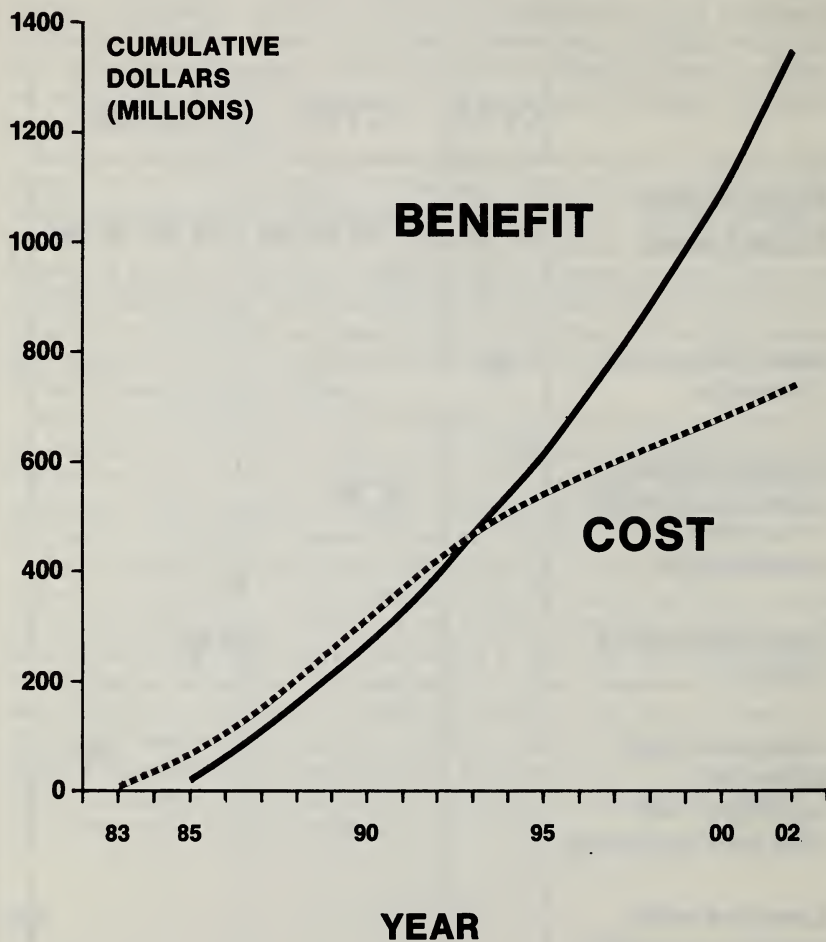
Between 1988 and 1990, the final technology upgrades will be incorporated into the automated system. The public search facilities will be expanded and direct worldwide system access and data exchange will be possible. Public dissemination capabilities will be expanded to include access to the system through telecommunications, for example, from Patent Depository Libraries.

The initial stage of development, which is defined in more detail at this time, is critical to maintaining the long-range schedule. The more significant milestones during this stage are the selection of the systems engineering contractor, refinement of the system architecture, specification of the initial operating components, and subsequent acquisition and installation of those components. Since most of these milestones are affected by external factors, they also carry the greatest risk of schedule slippage. Except for the acquisition of the system engineering contractor support, other concurrent procurements are projected on 12 to 18 month schedules. While the schedule for the first stage is ambitious, it is possible to achieve it with the strategy that has been outlined.

Initial Operating Capability Implementation Schedule

	CY'82		CY'83				CY'84			
First Stage Milestones	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Select Integration Contractor		▼								
Complete initial operating capability component specifications			▼▼							
Award component contracts							▼▼			
Complete initial component installation and data base conversion										▼
Complete initial operating capability acceptance tests										▼

COST BENEFITS



COST ESTIMATES

Total automation program costs are estimated to be over \$300 million during the next eight years. The first stage of the long range program will amount to about \$30 million—for fiscal years 83 and 84. About half of the latter represents base systems costs—equipment and personnel—which would be incurred even if there were no improvements. The remainder is for new components and development services.

While program costs accumulate to a high level during the eight-year development, they will be balanced by improvements in the quality of PTO operations and by cost benefits. Base systems costs, without the improvements that have been planned, would amount to almost \$60 million over this period if continued at the current rate of more than \$7 million a year. Preparation of material for printing, which costs almost \$15 million annually, will be accomplished using the system and will offset much of the program costs over the system life, projected to run through the 1990's. Patent copy sales, patent classification and documentation, and other dissemination functions will also be supported with similar offsetting cost benefits. Other cost benefits will derive from personnel and space cost reductions or avoidances. In addition to these tangible benefits, which should at least balance the costs over the system life, the benefits of data base integrity, timely examination, and much improved public access, will yield intangible benefits that will far outweigh the costs. Cost estimates for the developmental period, through fiscal year 1990, are summarized in the accompanying table.

Cost Estimates by Major Categories
(In millions, 1982 Dollars)

	Fiscal Year							
Category	1983	1984	1985	1986	1987	1988	1989	1990
Workstations and								
Workstation Services	1.5	1.0	3.0	12.2	21.4	30.8	32.0	33.3
Text and Image Capture .....	.4	1.3	7.6	7.6	7.7	1.0	1.0	1.1
Data Base Processing .....	.5	1.6	3.5	7.0	9.7	12.9	13.0	13.3
Management Service	1.7	2.4	6.0	6.4	6.8	7.2	7.6	8.1
Network and Process								
Control .....	.7	.4	1.4	1.6	1.6	1.7	2.1	2.5
Engineering/Systems								
Integration	2.0	2.0	2.0	2.0	2.0	1.5	—	—
Current Systems and								
PTO Staff	7.2	7.5	7.0	6.5	5.9	5.9	5.9	5.9
TOTAL	14.0	16.2	0.5	43.3	55.1	61.0	61.1	64.2 =345.4
PTO Offsets	7.2	7.5	25.2	32.7	49.1	50.7	53.9	57.3 =254.2
Net Program Costs	6.8	8.7	5.3	10.6	6.0	10.3	7.2	6.9 = 91.2

As operational capabilities are developed, they will enter the operation and maintenance phase. Cost estimates were projected to include both new acquisition and operation/maintenance costs.

Additional systems operating personnel costs were not included on the assumption that any increase would be more than offset by other personnel cost savings that will accrue from the system. Developmental costs will peak during the second stage and drop to an operating level after stage three is completed, that is, after fiscal year 1990. As may be seen, workstation and associated workstation services will cost more than any other category of expense because of the projected large number of users. Data base processing, including search, electronic text and image processing, represent the next highest cost. The cost of data capture also peaks during the second stage. Management services and network related processing remain relatively constant over this time period. Current systems will be supplanted by FY 1987, resulting in a decrease in costs in that category. Systems engineering services are projected to terminate in Fiscal Year 1988.

SUMMARY

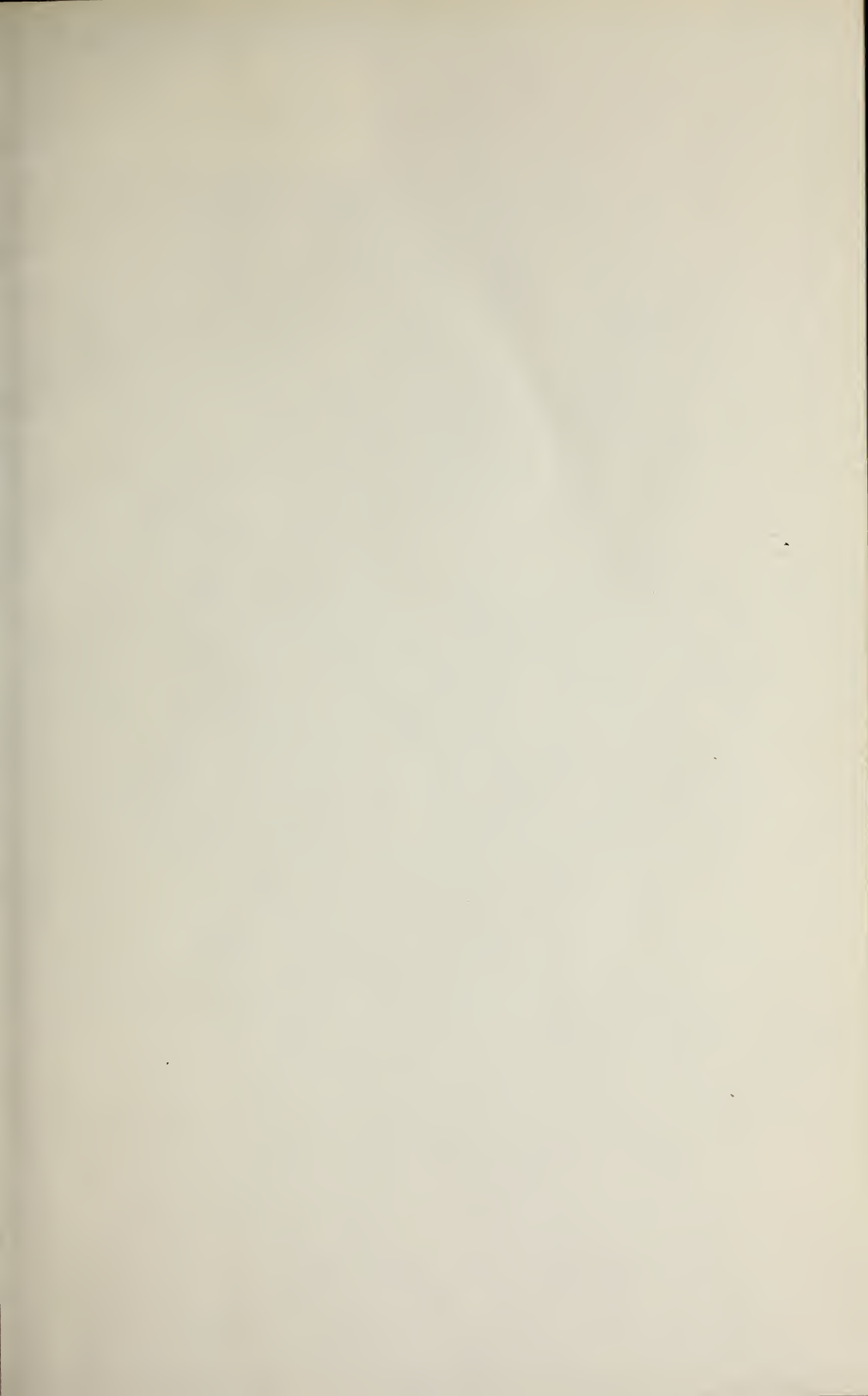
The plan summarized in the preceding pages is aimed at fully automating the PTO operations by 1990. It is built around the concept of paperless operations with electronic text and computer accessible image data bases replacing current paper files. All current functions and processes will be performed using electronic workstations and other automated system components.

Automation will be accomplished in three stages. During the first stage basic operational capabilities will be provided to automate one patent group and all trademark functions. Pre-examination, post-examination, classification, and management support will be automated also. During the second stage, all patent groups will be automated and a paperless operation achieved. The third stage, ending in 1990, will provide for worldwide electronic access and expanded dissemination capabilities.

The plan embodies a management strategy that has proven successful in large programs of this magnitude. Capabilities will be implemented incrementally. Modular components will be acquired in parallel and integrated with minimal conflict and risk to overall program schedules. A systems engineering contractor will be used to complete the system architecture, specify components, and accomplish system integration. The management approach centralizes responsibility and authority for the program and provides executive direction and guidance through an automation coordinating committee.

This plan, which has been set in motion, will satisfy the Patent and Trademark Office mission needs for improved operations through automation.

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FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
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